

DEP SPECIFICATION

INSTRUMENTATION DOCUMENTS AND DRAWINGS

DEP 32.31.00.34-Gen.

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DESIGN AND ENGINEERING PRACTICE



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PREFACE

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These views are based on the experience acquired during involvement with the design, construction, operation and maintenance of processing units and facilities. Where deemed appropriate DEPs are based on, or reference international, regional, national and industry standards.

The objective is to set the standard for good design and engineering practice to be applied by Shell companies in oil and gas production, oil refining, gas handling, gasification, chemical processing, or any other such facility, and thereby to help achieve maximum technical and economic benefit from standardization.

The information set forth in these publications is provided to Shell companies for their consideration and decision to implement. This is of particular importance where DEPs may not cover every requirement or diversity of condition at each locality. The system of DEPs is expected to be sufficiently flexible to allow individual Operating Units to adapt the information set forth in DEPs to their own environment and requirements.

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- 3) Contractors/subcontractors and Manufacturers/Suppliers under a contract with users referred to under 1) or 2) which requires that tenders for projects, materials supplied or - generally - work performed on behalf of the said users comply with the relevant standards.

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All administrative queries should be directed to the DEP Administrator in Shell GSI.

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1. INTRODUCTION

1.1 SCOPE

This DEP specifies requirements and give recommendations for instrumentation documentation and drawings, including the organization, naming, formatting, electronic delivery and requirements for as-built accuracy.

This DEP addresses instrumentation under the following categories:

- general instrumentation (group 30);
- analyzers and field instruments (group 31, 32, 33, 34, 35 & 36), and
- instrument installation.

Within the above categories, various documentation and drawing types are covered, including:

- instrumentation requisitions;
- instrument engineering data sheets;
- composite instrument manuals;
- instrumentation schematic diagrams;
- instrument loop diagrams;
- logic diagrams;
- narratives;
- alarm system documentation;
- cause and effect drawings;
- system cabinets/auxiliary cabinets;
- instrument/electrical interface cabinets;
- distributed control system (DCS) configuration;
- instrumented protective function (IPF) configuration.

This is a revision of the DEP of the same number dated September 2011; see (1.5) regarding the changes.

1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise authorised by Shell GSI, the distribution of this DEP is confined to Shell companies and, where necessary, to Contractors and Manufacturers/Suppliers nominated by them. Any authorised access to DEPs does not for that reason constitute an authorisation to any documents, data or information to which the DEPs may refer.

This DEP is intended for use in facilities related to oil and gas production, gas handling, oil refining, chemical processing, gasification, distribution and supply/marketing. This DEP may also be applied in other similar facilities.

When DEPs are applied, a Management of Change (MOC) process shall be implemented; this is of particular importance when existing facilities are to be modified.

If national and/or local regulations exist in which some of the requirements could be more stringent than in this DEP, the Contractor shall determine by careful scrutiny which of the requirements are the more stringent and which combination of requirements will be acceptable with regards to the safety, environmental, economic and legal aspects. In all cases, the Contractor shall inform the Principal of any deviation from the requirements of this DEP which is considered to be necessary in order to comply with national and/or local

regulations. The Principal may then negotiate with the Authorities concerned, the objective being to obtain agreement to follow this DEP as closely as possible.

1.3 DEFINITIONS

1.3.1 General definitions

The **Contractor** is the party that carries out all or part of the design, engineering, procurement, construction, commissioning or management of a project or operation of a facility. The Principal may undertake all or part of the duties of the Contractor.

The **Manufacturer/Supplier** is the party that manufactures or supplies equipment and services to perform the duties specified by the Contractor.

The **Principal** is the party that initiates the project and ultimately pays for it. The Principal may also include an agent or consultant authorised to act for, and on behalf of, the Principal.

The word **shall** indicates a requirement.

The word **should** indicates a recommendation.

The word **may** indicates a permitted option.

1.3.2 Specific definitions

Term	Definition
Distributed Control System	A configurable microprocessor based control system. Also referred to as BPCS (Basic Process Control System)
Instrumented Protective System	The (electrical and/or electronic and or programmable electronic) logic solver component of the Instrumented Protective Function complete with input and output equipment. Synonymous with SSDS and SIS.

1.3.3 Abbreviations

Term	Definition
AC	Alternating Current
CCTV	Closed Circuit Television
DC	Direct Current
DCS	Distributed Control System. Also referred to as BPCS (Basic Process Control System)
DVD	Digital video disc
ESD	Emergency Shutdown
FAT	Factory Acceptance Test
IPF	Instrumented Protective Function, now known as SIF (Safety Instrumented Function)
IPS	Instrumented Protective System, now known as SIS (Safety Instrumented System)
LNG	Liquid natural gas
MDF	Main Distribution Frame
MTR	Mill Test Reports
PEFS	Process Engineering Flow Scheme
PMI	Positive Material Identification
SAT	Site Acceptance Test
SPI	SmartPlant Instrumentation
SPIR	Spare Parts Interchangeability Report
SRS	Safety Requirements Specification
USA	United States of America
WOUSA	World outside USA

1.4 CROSS-REFERENCES

Where cross-references to other parts of this DEP are made, the referenced section or clause number is shown in brackets (). Other documents referenced by this DEP are listed in (4).

1.5 SUMMARY OF MAIN CHANGES

This DEP is a full revision of the DEP of the same number dated September 2011. The following are the main, non-editorial changes.

Section/Clause	Change
All	Restructured and clarified requirements, enforced shall/should.

1.6 COMMENTS ON THIS DEP

Comments on this DEP may be submitted to the Administrator using one of the following options:

Shell DEPs Online (Users with access to Shell DEPs Online)	Enter the Shell DEPs Online system at https://www.shelldeps.com Select a DEP and then go to the details screen for that DEP. Click on the "Give feedback" link, fill in the online form and submit.
DEP Feedback System (Users with access to Shell Wide Web)	Enter comments directly in the DEP Feedback System which is accessible from the Technical Standards Portal http://swwww.shell.com/standards . Select "Submit DEP Feedback", fill in the online form and submit.
DEP Standard Form (other users)	Use DEP Standard Form 00.00.05.80-Gen. to record feedback and email the form to the Administrator at standards@shell.com .

Feedback that has been registered in the DEP Feedback System by using one of the above options will be reviewed by the DEP Custodian for potential improvements to the DEP.

1.7 DUAL UNITS

This DEP contains both the International System (SI) units, as well as the corresponding US Customary (USC) units, which are given following the SI units in brackets. When agreed by the Principal, the indicated USC values/units may be used.

1.8 NON NORMATIVE TEXT (COMMENTARY)

Text shown in italic style in this DEP indicates text that is non-normative and is provided as explanation or background information only.

Non-normative text is normally indented slightly to the right of the relevant DEP clause.

2. GENERAL REQUIREMENTS

2.1 GENERAL

2.1.1 General

1. A set of instrumentation documents and drawings shall be prepared for each project and include items as specified in this DEP.
2. The instrumentation documents and drawings shall follow the following:
 - To be issued such that sufficient time is allowed for instrumentation design and engineering, purchasing and installation, including time required for review and approval process by the Principal.
 - The content of each document or drawing to be such that it will allow associated activities, such as purchasing, installation of all instrumentation at the construction site, and will serve as reference for future maintenance, changes and/or extension to the instrumentation.
 - The content of the documents and drawings, the number of copies required the need for additional documents, and the procedures for commenting and/or approval to be in accordance with requirements of the Principal.
3. Commercially available instrumentation electronic design and drawing (software) tools shall be used for documents and drawings produced by the project, however, for exchangeability reasons, the specific software package, version and format is subject to approval by the Principal.
4. Self-documenting facilities in the DCS and IPS should be used to their fullest capabilities.
5. All parts and sections of any form, sheet or other document which requires filling in shall be completed and where a particular part of any document is not applicable it is to be indicated.

2.1.2 Software formats

1. The following software for instrumentation documentation shall be used for greenfield projects:
 - a. SmartPlant Instrumentation (SPI - version as defined by the Principal) for instrument index, instrument data sheets, instrument loop drawings;
 - b. SmartPlant P&ID (version as defined by the Principal) for CAD drawings (examples system architecture drawings, panel drawings, cable routing drawings);
 - c. Microsoft Visio (version as defined by the Principal) for system block diagrams and other simple drawings;
 - d. Microsoft Word for all project documents (example- narrative descriptions, specification for control systems));
 - e. Microsoft Excel for calculations, Cause and Effect diagrams, and list based documents (example- equipment lists, load lists).
2. For additional acceptable formats refer to DEP 82.00.10.30-Gen.
3. The use of SPI (hosting of the database and third party access, audit tools and audit frequency, minimum fields during various stages of the project) shall be as specified by the Principal.
4. If an operating site has an instance of SPI, then that instance shall be used for all data entry.
5. The merging of SPI databases should be avoided.

2.2 IDENTIFICATION

1. All the documents and drawings shall be as per the following:
 - All documents and drawings to be provided with a registration number from the series of numbers allocated to the project, together with a code number for classification and identification.
 - The code number to consist of a prefix, project number, group number and a symbol.
 - Documents and drawings prepared for a specific indent to bear the relevant complete indent number.
 - All documents and drawings to bear proper references to related documents, construction drawings, and indent numbers for the materials required.
 - All instrument related layout drawings of control rooms, auxiliary rooms and analyser houses, to indicate the building and room number as appropriate.
 - Where multi-sheet drawings (2.4) consist of a large number of sheets, revisions to be indicated for each sheet.
 - For each revision, the cover sheet and the revision index sheet to be re-issued together with the revised sheets.
 - All the revised sheets to bear the same revision letter irrespective of the last revision letter on the individual sheets.
 - All revised sheets to bear the same revision indicator as the cover sheet.
 - For multi-sheet drawings where signatures are applied for approval or checking, these to be indicated on the cover sheet only.
 - Where a full title block is applied this to be used on the cover sheet only.
 - Continuation sheets to be sufficiently titled to link them clearly to the cover sheet and include project title, drawing title, project, drawing number and sheet number.

2.3 DRAFTING TECHNIQUES AND DRAWING SIZES

1. Refer DEP 02.00.00.10-Gen for drafting techniques, drawing sizes, preparation and, where applicable, microfilming of technical drawings.
2. The appropriate paper sizes noted in the table 1 below shall be used.
3. The drawings size shall be determined taking into consideration the ultimate use for the document, e.g. for on-site day-to-day maintenance.

The actual size is dependent on the subject matter (e.g. A3 for cause and effects).
4. The basic format of each type of document produced by the project shall be subject to approval by the Principal prior to large scale application.
5. The drawings produced by the packaged vendors shall be consistent with the project drawing and documents; see (2.7).
6. Copies of drawings issued for comments or information shall have a maximum size of A3.

The following provides examples of document sizes for various types of documents, as well as corresponding North American sizes:

Table 1 Document sizes

Document	Size (WOUSA)	Size (USA & Canada)
Plans and Procedures	A4	8 1/2" x 11"
Specifications	A4	8 1/2" x 11"
Data and Calculations	A4	8 1/2" x 11"
Lists	A4 or A3	8 1/2" x 11" or 11" x 17"
Drawings	A3 or A1	11" x 17" or 22" x 34"

2.4 MULTI-SHEET DRAWINGS

1. Where there is requirement for documentation to be multiple sheets it shall be agreed with the Principal.
2. Where multi-sheet documentation is used, it shall consist of the the following:
 - a. a cover sheet;
 - b. index to sheets, giving the applicable revision indicator of the sheets contained in the set;
 - c. the sequence of the data sheets and their numbering to be as indicated in the index sheet;
 - d. listing of symbols and abbreviations used;
 - e. detail sheets (as indicated on the index sheet) giving the required information;
 - f. listing of the tag numbers with reference to the relevant sheets;
 - g. for multi-sheet drawings, only A3 and A4 sizes to be used;
 - h. all sheets of a multi-sheet drawing to have the same size.
3. Mixing of A3 and A4 sizes in one multi-sheet drawing set shall not be permitted.
4. Where the subject cannot be arranged entirely on one sheet, such as in case with logic diagrams, relay diagrams or instrument loop diagrams, the subject shall be continued on the following sheet(s) with proper cross-references at the demarcation points.

2.5 TECHNICAL SPECIFICATIONS & CONSTRUCTION DRAWINGS

1. Any references to Shell standard drawings, if required, shall be made in the technical specification.
2. Under no circumstances shall a standard drawing be issued in a modified format.
3. Any customised version of an published Standard Drawing shall be issued as a separately named and numbered engineering drawing.
4. Specification for instrumentation items shall utilize the standard requisition sheets.